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Institutional premarket testing of chiffon pie mixes

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INSTITUTIONAL PREMARKET TESTING OF CHIFFON PIE MIXES

by

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INTRODUCTION

The biggest area of change in food production during the past few years has been caused by the introduction of processed foods. New products are appearing constantly and with such rapidity that acceptance by food services is not commensurate with their appearance on the market. Perhaps one of the reasons for this lag in acceptance has been that very few well-controlled new product tests have been reported which have given reliable and informative information to the food service industry. There is a need for well-designed tests which will give basic information as to acceptability and time savings of these new processed foods. Many food service members, who have lacked sufficient knowledge of how to make tests, have been forced to do so on an individual basis. Frequently such tests are limited in their value. However, those tests which have been made have indicated that some processed foods have significant advantages in institutional use without a loss in standards in quality (1,2,3,4).

Within the past year several large food manufacturers have introduced chiffon pie fillings for institutional use. One other nationally known company is ready to make such an introduction. The acceptance of these chiffon products has been slow in the institutional field. Whether this has been because of a lower quality of the product or a failure to demonstrate savings or other advantages is not known. Some institutions who have tried the new chiffon mixes have claimed they are somewhat inferior in quality to chiffon pie fillings made from standard recipes, but do give a consistent product and are time savers.

This study was made primarily to ascertain differences in the quality of chiffon pies as made in an institution from a standard recipe and from a chiffon pie mix. Brief records were made of times required to make the two types of lemon chiffon fillings in large quantity, although this was not the main purpose of the test. Cost comparisons could not be calculated in this research because one mix tested has not yet been put on the market.

A search in literature shows no previous reports comparing chiffon pie mixes with a standard product.

PROCEDURE

Panels Used. Two types of taste panels plus two objective tests were used to judge quality. In addition, six judges, selected because of their training in home economics or as homemakers, scored lemon chiffon fillings on points. This latter group was called a panel of six judges and for these tests the products were produced in small quantity. In contrast, chiffon pie fillings were made for the other two taste panels in large quantity.

The panel of six judges was used to obtain an estimate of the quality of several lemon chiffon pie mixes on the market, used either for home or for institutional use, in comparison with a known high quality home type product. This information would be of value in giving a measure by which to judge the relative quality of chiffon mixes versus standard products as evaluated by a group of home economists and others who knew quality in foods and could act as a standard later in estimating the results obtained in comparing institutionally

prepared pie fillings made from mixes and from standard recipes. The two taste panels were used to obtain an evaluation of chiffon pie mixes when made at an institutional level.

Products Tested. One product, commonly used by homemakers, was obtained from grocer's shelves (B). Another product was an institutional mix which had just recently appeared on the market (D). The third mix used was a product about to be introduced on the market (C). This last product was the experimental item used to make the chiffon pie fillings for the other tests at the institutional level. Montana State University had been asked to evaluate item C by the manufacturer, and to give an estimate as to what this new product would do on the market in comparison with other chiffon mixes and against high quality products made from standard recipes. A score sheet was set up for use by this panel for the evaluation of the factors of flavor, texture, color and appearance, and volume. A copy of the score sheet is to be found in Figure 1.

The recipe used for the control filling (A) was chosen from recipes for lemon chiffon fillings made from two well-known and widely used small quantity cookbooks. A seminar class in Home Economics, composed of the seven members of the home economics teaching staff of Montana State University and two graduate students in this field, made the selection after tasting fillings made from the two recipes. The control recipe contained unflavored gelatine, sugar, cold water, fresh whole eggs, salt, fresh lemon juice and grated lemon rind. (Recipes for the control and for the three mixes appear in the appendix).

Panel of Six Scoring. Three replicas of the four lemon chiffon fillings mentioned above, (A,B,C,D), were made on successive days and the

panel of six judges assembled at four o'clock each day to taste the four samples and score them. The samples were marked with letters A, B, C, and D, and there was no systematic offering of samples. They were offered to the panel of six judges at random for tasting. A different key of A, B, C, and D was used for each replica. From these scores, a mean score of each of the four types of filling was calculated. Table I gives the panel of six scores for the three replicas and the mean scores. These means obtained from scores of the panel of six were subjected to a null hypothesis and tested by an analysis of variance. See Table II.

Objective Tests. Two objective tests were made, the first a Ph test to determine the degree of acidity for the samples in small quantity for each of the three replicas. See Table III. Beckman's Ph meter was used for these readings. An attempt was made to correlate the opinions of the panel of six judges with objective findings. One of the questions which seemed pertinent to a quality determination was - did relative acidity affect opinions as to quality?

The second objective test was a volume test to indicate the number of cubic centimeters one gram of the fillings occupied. This was done by first weighing the samples in grams, then finding its volume in cubic centimeters. The volume in cubic centimeters divided by the weight in grams gave the number of cubic centimeters which one gram would occupy. This volume is shown in Table IV. The method of obtaining the volume of the sample was to note its depth in a mixing bowl, then replace it by water to the same depth in the bowl and determine this volume of water which, of course, would be the volume of the mix. The question as to quality in this objective test was - did the amount of air or the volume

affect the opinions of the panel of six judges as to quality?

Times were taken for the preparation of the small quantity fillings on each of the three days and are shown in Table VII. The time for preparing the control filling (A) included: getting the eggs and lemons from the refrigerator, breaking the eggs, grating the lemon rind, squeezing the lemon juice and measuring the other ingredients plus the required mixing, cooking and beating until the filling was poured into the pie plate. The times for preparing the filling mixes (B,C,D) included: opening the packages, weighing ingredients, mixing, any required cooking, and beating the prescribed time until fillings were finished and poured into the pie plates. The fillings for the panel of six judges were prepared in the experimental laboratory at Montana State University's home economics department. Cooking was done on a General Electric range and beating was done in a family size 3 quart Hamilton-Beach electric mixer. The fillings were poured into 8½" pyrex pie plates.

Institutional Level Tests. Two tests were offered in this institutional level testing to both the consumer and expert panel; one a lemon chiffon filling mix called the "experimental" was compared to the "standard". The standard contained frozen whole eggs, sugar, lemon juice, lemon rind, plain gelatine, cold water and whipped cream. The other experimental product was a strawberry chiffon filling mix, also compared to the "standard", which contained frozen strawberries, sugar, strawberry flavored gelatine, hot water, lemon juice, salt, egg whites and whipping cream. Recipes for the standards were taken from the files of Montana State University's food service department. The experimental mixes were

made from product "C", the product about to come on the market. The directions on the packages were followed in making these lemon and strawberry chiffon mixes. (Recipes for these appear in the appendix).

For the lemon chiffon pies - fifty pies were made from the standard recipe, fifty-four from the mix; for the strawberry chiffon pies - ninety-three pies were made from the standard recipe, ten pies from the mix. Required cooking for the standard lemon chiffon filling was done in a twenty-gallon steam kettle. An 80-quart Hobart Mixer, Model T-801, with a heavy duty wire whip, #M-80D, was used for beating the standard lemon and strawberry chiffon fillings and the experimental lemon chiffon filling. The experimental strawberry chiffon filling was beaten in a Hobart Mixer, Model A-200, in a 20-quart bowl, #KP20, with wire whip #KP20D. The fillings were poured into baked pastry shells in 9" aluminum pie pans.

These tests occurred after the panel of six tests cited above occurred and the fillings were served in pastry shells at the Montana State University Lodge. These two fillings were compared on different days at 4:30 p.m., a time when taste acuity is thought to be highest. The triangle test was used for these tests. The expert panel was blindfolded and asked to distinguish which two pieces of pie were alike (they had been given three pieces of pie, two of which were the same). After correctly pairing the two like samples, they were asked to state a preference between the two samples they had paired and the odd sample. The results of this triangle test were used to calculate chi-squares to determine the significance of the judges' ability to pair correctly. If the judges failed to pair correctly a significant number of times,

then the two products could be considered identical or without difference even to an expert taste. The blindfolds were then removed and the judges used a score sheet (Figure 2) to indicate reasons for their preference - flavor, texture, color, etc. They were also asked to make additional comments on the two types of fillings. These comments were of value because they would indicate differences which might be apparent to a sensitive palate and might give clues as to why one filling was preferred over another.

Expert Panel. The panel of expert tasters was selected according to methods used by Kotschevar (1). This was called the "expert panel" and had six members. This panel should be differentiated from the panel of six judges described above. This expert panel was used to detect quality differences between the standard and experimental chiffon pie fillings.

Consumer Panel. The consumer panel, selected by random from those who first came in to eat in the dormitory dining room, was a general preference panel. Fifty-five students were given a piece of each type of lemon chiffon pie; twenty-six students were given a piece of each type of strawberry chiffon pie. They were given slips of paper which asked them to check the pie they preferred. (The slip given the consumer panel judge is shown in the appendix).

The data obtained from the consumer panel was subjected to a statistical test to ascertain significance. This was the ordinary "t-test" with a slightly different formula.

"Tasters who are unable to detect a difference between samples, or to whom both samples are equally acceptable, sometimes indicate no

preference. These "no preference" selections have to be taken into consideration in evaluating the results of comparisons or some means used to dispose of them.

In quality control work with an expert panel, the inability of a judge to discriminate between samples permits the exclusion of his response from the computations. However, this practice, when applied to a general tasting panel, might give a distorted value to a preference which may actually be slight. For this reason, the practice has been adopted in many food testing laboratories of including "no choice" notations in the N (total number of preferences) of the formula.

$$\frac{x}{\sigma} = \frac{a - b}{\sqrt{N}}$$

As an example, if 100 people tasted samples A and B and 29 prefer A, 11 prefer B, and 60 put "no choice" on their slips, the usual calculation of the t-test will indicate a probable chance of 1.8 which is not a sufficiently large statistic to indicate significance. The same result will be obtained if it is reasoned that those tasters who could not make an actual choice between A and B, would, in an arbitrary choice, have given equal preference to A and B. However, if "no choice" notations are disregarded, and their number omitted from the calculations, the result would be 2.85 which would make the preference for sample A significant. It is unlikely that a comparison in which 60 out of 100 tasters could make no choice would show that a real preference existed for one sample over the other. Therefore, no preferences by the panel are included in the total

number of examinations, N, but not in "a" or "b". This procedure is consistent with practices in many foods testing laboratories."*

The time for preparing the standard fillings included: the preparation time of the baker, i.e., grating the lemon rind and weighing or measuring other ingredients as well as actual cooking and beating time from the beginning of preparation to pouring the finished fillings into the pie pans. The time for preparing the experimental fillings included: emptying contents of packages into the mixing bowl, measuring and adding sugar and boiling water, beating the required time, and pouring the filling into baked pastry shells.

RESULTS AND DISCUSSION

Panel of Six Scores. Table I gives the individual scores of the judges for the panel of six. Two of the judges, number 1 and number 5, tended to score lower than the others, but it will be noted that they are somewhat consistent in their opinions between replicas even though their scores were lower than those of the others.

*The above material was written by Dr. Lendal H. Kotschevar, after consulting a private memorandum, No. M-2, copy 3, entitled "Progress Memorandum, Psychometric Practices and Plans" from National Dairies.

TABLE I

PANEL OF SIX SCORES

			SAMPLES			
			A	B	C	D
1st Replica	Judge 1		61	70	64	60
	Judge 2		96	94	93	76
	Judge 3		76	86	81	58
	Judge 4		92	85	78	76
	Judge 5		50	85	60	65
	Judge 6		87	75	73	74
		Totals	462	495	449	409
		Mean	77	82.5	74.8	68.2

			SAMPLES			
			A	B	C	D
2nd Replica	Judge 1		60	75	65	50
	Judge 2		84	88	87	69
	Judge 3		90	84	85	60
	Judge 4		96	88	90	71
	Judge 5		80	40	30	25
	Judge 6		92	86	80	62
		Totals	502	461	437	337
		Mean	83.7	76.8	72.8	56.2

			SAMPLES			
			A	B	C	D
3rd Replica	Judge 1		65	70	70	50
	Judge 2		89	81	85	70
	Judge 3		91	90	85	54
	Judge 4		98	87	90	69
	Judge 5		95	65	55	30
	Judge 6		91	90	78	50
		Totals	529	483	463	323
		Mean	88.2	80.5	77.2	53.9

	SAMPLES			
	A	B	C	D
Total for all Replicas	1493	1439	1349	1069
Mean for all Scores	82.9	79.9	74.9	59.4

The means for samples A, B, C, & D were respectively 82.94, 79.94, 74.94, and 59.39. The results of the analysis of variance for the means of the panel of six, as shown in Table II, indicate that a significant difference exists between them.

TABLE II

*ANALYSIS OF VARIANCE FOR FOUR SAMPLES OF CHIFFON PIE FILLINGS

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F	F .95
Fillings	7172	3	2390.6	44.0	8.62
Judges	9449	5	1889.8	34.8	4.50
Replicas	140	2	70	1.3	19.47
Error	3312	61	54.3		
Total	20,073	71			

* The calculations for these data were made by L.H. Kotschevar

Independent tests of significance, as determined by methods used by Snedecor (5), indicated that there was no significant difference between samples A and B, and no significant difference between samples B and C, but there was a significant difference between samples A and C, and sample D varied significantly from all the other three samples.

The significant difference found between judges is caused by the variability in the values used in the scoring of the two judges mentioned above. There is some evidence of interaction but no tests were made to judge their significance.

Volume was possibly one of the factors which raised the score on sample B so that it did not vary significantly from sample A. If volume

scores had been eliminated, the mean score difference between A and B might have been significantly different.

Objective Tests. Table III gives the results of the Ph test taken on Beckman's Ph Meter. This test was made for the small quantity samples of the Lemon chiffon fillings, A, B, C and D. It is interesting to note that some of the members of the panel of six judges had suggested the addition of more lemon juice to improve samples B & C and to make them approach the excellent flavor of sample A, but in the Ph test these samples showed higher acidity than sample A. Probably they were trying to indicate that the flavor of samples B and C did not seem to be a natural flavor like sample A's.

Although the control recipe contained real lemon juice and grated lemon rind, the protein (eggs) used in the recipe might have had a tendency to neutralize the acidity to the taste. This filling was mentioned by the judges as having the most pleasing and natural flavor. Sample D was thought to have a musky flavor and a grainy texture like uncooked starch. Another question which had to do with the quality of sample D was whether or not the sugar used was corn sugar.

TABLE III

* PH TEST - LEMON CHIFFON FILLINGS

SAMPLES	Replica 1	Replica 2	Replica 3
A	4.9	4.5	4.3
B	3.3	3.3	4.1
C	3.4	3.3	3.4
D	3.0	2.9	2.9

* Mr. Brunett of Montana State University's Pharmacy School took the readings on Beckman's Ph Meter for the above.

Table IV shows the results of the Volume test for the Lemon chiffon samples. It is interesting to note that the six judges on the individual score sheets rated the volume factor high in points on both samples B and C which is in line with the results of the volume test for both of these samples.

TABLE IV

* VOLUME TEST - SHOWING THE NUMBER OF CUBIC CENTIMETERS ONE GRAM OF LEMON CHIFFON FILLING OCCUPIED

	SAMPLES			
	A	B	C	D
Replica 1	**-	3.1	2.8	1.85
Replica 2	2.36	3.67	3.83	2.27
Replica 3	2.75	3.83	3.82	2.14

* Calculations for the above data were made by Dr. G.D. Shallenberger

** Data for sample A, Replica 1, is missing from this table because the first attempt to find volume was made by a direct method, namely pouring the mix into a graduated cylinder. This, however, proved inaccurate because of space discontinuities appearing in the mix and was replaced by the method described in the Procedure, page 4.

Expert Panel Judgments. Table V shows Chi-squares obtained from the triangle tests of the expert panel. This indicates that the panel was able to distinguish a significant difference between the standard chiffon fillings and the chiffon filling mixes. An insufficient number of judges was used to give significances to their choices at the 5% level.

TABLE V

CHI-SQUARES INDICATING THE EXPERT PANEL'S ABILITY TO DISTINGUISH QUALITY BETWEEN THE STANDARD AND EXPERIMENTAL CHIFFON PIE FILLINGS

Variety	Prefer Standard	Prefer Experimental	χ
Lemon Chiffon	6	0	2.5
Strawberry Chiffon	6	0	2.5

$$\frac{\chi}{\sigma} .95 = 1.96$$

At no time did an expert judge indicate a preference for the experimental item. Reasons given by this expert panel for preferring the standard lemon chiffon filling were: more subtle and natural lemon flavor, creamier, richer and more solid texture, more pleasing color and appearance. They stated they felt the experimental was too frothy and had a spongy feeling in the mouth, and that the color was a little too yellow. They considered the flavor good, however. The standard strawberry chiffon filling was preferred over the experimental because of flavor, texture, color and appearance. In commenting on the experimental strawberry chiffon filling, they felt the texture was too light

and frothy, but were of the opinion that the color and flavor were acceptable.

It was suggested that the lemon chiffon mix might be improved in flavor, texture and color by the addition of lemon juice, lemon rind and whipped cream. Also, it was the opinion of some of the food service staff and employees that the strawberry chiffon mix would be much improved by adding frozen strawberries, lemon juice and whipped cream for flavor, texture, color and appearance.

Consumer Panel Preferences. Preferences of the consumer panel for the two types of fillings are shown in Table VI and the significance of these preferences is evaluated according to calculations for chi-squares. Comments from some of the students were that the standard filling had a superior flavor, better color and tasted "like what they had at home". Some students indicated that the chiffon filling mixes were displeasing because of color and too much froth or air; others that "so much fluff was not worth the time taken to eat it".

TABLE VI

SIGNIFICANCE OF THE CONSUMER PANEL'S PREFERENCE FOR STANDARD OR EXPERIMENTAL

Variety	Standard Filling	Experimental Filling	No Preference	χ
Lemon Chiffon	42	9	4	4.4
Strawberry Chiffon	24	2	0	4.3

$$\frac{\chi}{\sigma} .95 = 1.96$$

Times of Preparation. Table VII gives information on time factors for preparation of the lemon chiffon fillings in small quantity and Table VIII summarizes time required to make the standard and experimental lemon chiffon pie fillings at the institutional level.

For the small quantity fillings, the control (A), took much longer than any of the mixes, (B,C,D). By comparison sample B took only 1/3 the time to prepare, sample C just about 1/2 the time, and sample D about 5/8's the time. Sample D took longer than either B or C to prepare because of the requirement of two separate boilings and also the beating of the chiffon whip with water and sugar. (See the procedure for this recipe on page 30) Times of preparation for the mixes (B,C,D) varied to some extent from one to the other with sample B taking the least time, followed by sample C, and sample D taking the longest time. Samples C and D did not vary too much in actual preparation time, however, but sample B varied considerably from both C and D.

Table VIII also shows it took 52 minutes longer to make 54 lemon chiffon fillings from the standard recipe at the institutional level than it did to make 50 fillings from the experimental recipe. This is about 1 minute more per pie.

TABLE VII

PREPARATION TIMES FOR THE LEMON CHIFFON FILLINGS IN SMALL QUANTITY

	Date of Preparation	SAMPLES A	B	C	D
Replica 1	April 22, 1958	35 min.	13 min.	18 min.	20 min.
Replica 2	April 23, 1958	33 min.	11 min.	17 min.	19 min.
Replica 3	April 24, 1958	32 min.	11 min.	17 min.	18 min.

TABLE VIII

PREPARATION TIME FOR THE LEMON CHIFFON FILLING IN LARGE QUANTITY

Date of Preparation	Standard	Experimental
May 12, 1958	127 min.	75 min.

SUMMARY

A panel of six qualified home economists judged four different lemon chiffon fillings made in small quantity; this panel found no significant difference between the quality of one chiffon filling mix and a chiffon filling made from a standard control recipe, but did find that two other fillings made from two other brands of chiffon filling mixes varied significantly in quality from the control.

Two objective tests were made on the small quantity lemon chiffon fillings; one a Ph test to determine acidity, the other a volume test. The filling made from the control recipe was found to have the lowest acidity on the Ph test. This filling had been judged to have the most pleasing and natural flavor. In the test for volume, the control recipe had more volume than one of the mixes, but considerably less than the other two mixes. These tests would indicate that while acidity and volume might affect acceptability, they were not decisive factors in influencing a preference.

Acceptability tests were made between chiffon pie fillings made from standard recipes and chiffon filling mixes for an institution. Lemon chiffon and strawberry chiffon fillings were tested. Two types of panels judged the chiffon fillings; an expert panel judged the fillings for quality differences and a consumer panel of 26 to 55 students, selected at random, judged the fillings for general preference. Both panels preferred the fillings made from the standard institution recipe over the fillings made from the mixes.

From a time standpoint, the fillings made from mixes proved more economical.

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Figure 1

SCORE SHEET FOR PANEL OF SIX JUDGES

LEMON CHIFFON PIE FILLING

NAME _____

DATE _____

	SAMPLES			
	A	B	C	D
I. FLAVOR - - - - - - - - - - - - -40				
A. Sweetness				
B. Tartness				
C. Natural, (any evidence of a terpene or artificial flavoring)				
II. TEXTURE - - - - - - - - - - - -20				
A. Lightness				
B. Degree of firmness				
III. COLOR & APPEARANCE - - - - -20				
IV. VOLUME - - - - - - - - - - - - 20				
100				
TOTAL -				

OTHER COMMENTS _____

Figure 2

SCORE SHEET FOR EXPERT PANEL OF SIX

_____ NAME

_____ DATE

PRODUCT_____

Of the three samples (A,B,C) which two are alike? _____

Which do you prefer?_____

Why do you prefer this?

1. **Flavor** _____
2. **Color & Appearance** _____
3. **Body** _____
4. **Texture** _____
5. **Other** _____

Other Comments _____

Figure 3

SCORE SHEET FOR CONSUMER'S PANEL
(GENERAL PREFERENCE PANEL)

PRODUCT_____ DATE_____

(Please encircle one) I Prefer: A B No Choice

CHIFFON FILLINGS USED IN STUDY

Lemon Chiffon Filling (Standard)

	50 Pies
Ingredients	**Amount**
Frozen Whole Eggs	6#
Sugar	10#
Lemon Juice	1½ gals.
Salt	¼ cup
Plain Gelatine	12 oz.
Cold Water	3 2/3 qts.
Lemon Rind	5 oz.
Sugar	10#
Frozen Egg Whites	9#
Whipping Cream	1½ gals.

Procedure:

1. Combine the whole eggs, sugar, lemon juice and salt. Cook and stir over low heat until thick. Remove from heat.

2. Combine the gelatine and the cold water. Add to the hot, thickened egg mixture. Stir until dissolved. Add lemon rind. Cool.

3. Beat egg whites until they begin to peak. Add sugar slowly, beating constantly until stiff, but moist. Fold into cooled gelatine mixture.

4. Fold in the whipped cream.

Lemon Chiffon Filling (Experimental)

54 Pies

Ingredients	Amount
Lemon Chiffon Filling	6# 15 oz.
Sugar	7½#
Boiling Water	3 gals.

Procedure:

1. Place lemon chiffon filling in mixer bowl. Add sugar. Add boiling water and stir with wire whip to dissolve.

2. Whip at medium speed for 12 to 14 minutes, or until mixture stands in soft peaks.

3. Pour into 9-inch baked pastry shells, allowing about 1¼ quarts of filling per pie. Chill until set - about 2 hours.

Strawberry Chiffon Filling (Standard)

93 Pies

Ingredients	Amounts
Strawberries, frozen	60#
Sugar	22#
Strawberry Flavored Gelatine	17# 2 oz.
Hot Water	4½ gals.
Lemon Juice	5½ cups
Salt	7 Tbsp.
Egg Whites	11#
Sugar	5# 8 oz.
Whipping Cream	6½ qts.

Procedure:

1. Crush strawberries with the larger amount of sugar. Dissolve the gelatine in boiling water. Cool slightly and add strawberries. Add salt and lemon juice. Cool until partly thick.

2. Beat egg whites. Add the smaller amount of sugar gradually. Fold into slighily thickened mixture. Fold in the whipped cream.

3. Pour into 9-inch baked pastry shells. Chill until set.

Strawberry Chiffon Filling (Experimental)

Ingredients	10 Pies Amount
Strawberry Chiffon Filling	1# 2½ oz.
Sugar	1# 4 oz.
Boiling Water	2 qts.

Procedure:

1. Place strawberry chiffon filling mix in mixer bowl. Add sugar. Add boiling water and stir with wire whip to dissolve.

2. Whip at medium speed for 12 to 14 minutes, or until mixture stands in soft peaks.

3. Pour into 9-inch baked pastry shells, allowing about 1¼ quarts filling per pie. Chill until set - about 2 hours.

Lemon Chiffon Filling - "A"

1 Pie

Ingredients	Amounts
Unflavored Gelatine	1½ tsp.
Sugar	1/3 cup
Egg Yolks	4
Lemon Rind, Grated	1 Tbsp.
Lemon Juice	¼ cup
Cold Water	1/3 cup
Egg Whites	4
Salt	¼ tsp.
Sugar	½ cup
Whipping Cream	½ cup

Procedure:

1. Dissolve gelatine in cold water.

2. In double-boiler top - beat egg yolks till light, add 1/3 cup sugar. Stir in lemon juice and rind, then gelatine mixture. Cook over boiling water, stirring 5 minutes or till thickened. Remove from heat.

3. Beat egg whites with salt till fairly stiff; add 1/2 cup sugar gradually and beat until stiff. Fold in lemon mixture. Pour into baked pastry shell; refrigerate until set.

4. Top with whipped cream, if desired.

Lemon Chiffon Filling - "B"

Ingredients	1 Pie Amount
Chiffon Filling	85 grams
Boiling Water	½ cup
Cold Water	½ cup
Sugar	1/3 cup

Procedure:

1. Place chiffon filling in mixing bowl. Add 1/2 cup boiling water and mix thoroughly.

2. Add 1/2 cup cold water. Then beat vigorously at highest speed of electric mixer, until mixture is very foamy - (takes about 1 min.)

3. Add 1/3 cup sugar and beat until filling stands in peaks - (takes 1 to 3 minutes).

4. Pour into cooled baked pastry shell. Chill until set - about 2 hrs. Serve plain or with whipped cream.

Lemon Chiffon Filling - "C"

	1 Pie
Ingredients	**Amounts**
Chiffon Mix	57 grams
Sugar	53 grams
Boiling Water	1¼ Tbsp.

Procedure:

1. Place chiffon mix in mixing bowl. Add sugar, then boiling water. Stir with wire whip to dissolve.

2. Whip at medium speed (#6) for 12 to 14 minutes, or until mixture stands in soft peaks.

3. Pour into baked pastry shell. Chill until set - about 2 hours.

Lemon Chiffon Filling - "D"

Ingredients	1 Pie Amount
Water	170 grams
Sugar	32 grams
Water	43 grams
Lemon Chiffon Base	43 grams
Water	85 grams
Lemon Chiffon Whip	43 grams
Sugar	53 grams

Procedure:

1. Dissolve 32 grams of sugar in 170 grams of water and bring to a boil.

2. Dissolve 43 grams of lemon chiffon base in 43 grams of water. Add to above mixture and bring to a good second boil. Remove from heat.

3. In the meantime beat up to a stiff point - 85 grams of water, 43 grams lemon chiffon whip and 53 grams of sugar.

4. Then fold all of this whip into the cooked mixture. Pour into baked pastry shell and refrigerate until set.